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The Barn Owl and Its Economic Value

BY WILLIAM L. FINLEY

PHOTOGRAPHS BY HERMAN T. BOHLMAN

THERE is not a tumble-down barn in the country that does not shelter good material for a naturalist's notebook. Take it all in all, the oldest shacks are the most productive. If there is a hole and a snug corner, some wren or bluebird has likely climbed in and built a home. If it be near town, some English sparrow has perhaps been living there all winter, and at the first indication of spring, has begun carrying in grass and sticks. Or, if the barn is real shaky and leaky, it may furnish a home for an owl.

The barn owl (*Strix pratincola*) is not hard to please when he needs a nesting place. He takes the steeple of a church, an old hollow sycamore along the creek or a cave in the mountain. I know of one pair that has lived for years in the tower of a court house. The town clock just below the nest must have been annoying at first during their day-sleep, but it was likely taken as a necessary disturbance, as we take the clang and rumble of the street-cars under our windows at night.

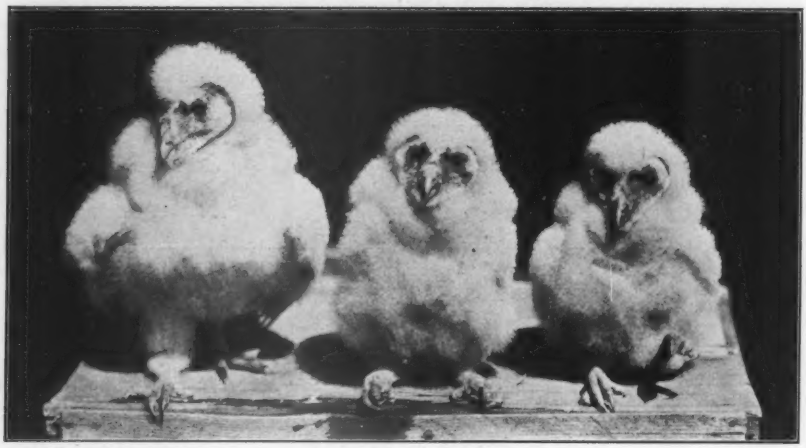
Years ago our nearest neighbor got a pair of pigeons, sawed two holes up in the corner of his barn and nailed up a soap box for them. The pigeons disappeared one day, and the next spring a pair of barn owls moved in. That was seven or eight years ago, but the old dusty box in the gable is still rented to the same pair. I have no doubt the tenants will remain as long as the barn lasts.

Our neighbor says his barn is worn out but resembles Mr. Burroughs' apple tree, which was not much good for apples but always bore a good crop of birds. The owl home is a valuable asset of the barn. The owner knows something of owls as well as fruit trees, for no other barn about the neighborhood shelters such a valuable family of birds, and he guards them as closely as he guards his cherries.

Now the barn owl is a queer looking tenant. No one is particularly fond of an owl. More than that, his actions are against him. It's natural that we haven't much sympathy for a fellow who is up and sneaking around all night, and sleeping thru the day. There is always some suspicion attached to a night-prowler,

whether he is a bird, man or beast. However, I have often watched the barn owl and studied his habits till I was satisfied he paid our neighbor more in one night than the pigeons, swallows and wrens did in a month. Not in singing; mercy no! Who ever heard of a song coming from a hooked bill? It was in real service about the farm, the service of a watchman or policeman, to rid the place of injurious rodents.

It was not an easy matter to picture these barn owls, situated as they were in the very peak of the old barn. The minute we approached the nest box, the old owl pitched headlong out of the hole and landed in a willow tree opposite. We had to climb a ladder and swing into the rafters to reach the nest. In such a place, we could hardly handle a camera. There was not even a loft to work from, so we secured a long ladder and nailed a couple of cross-pieces strong enough to hold a board. Crawling up in a stooped position, we took the back out of the nest box and arranged so it would drop down and show the interior or could be fastened up, at will.



BARN OWLS ABOUT 24 DAYS OLD

A month later, we climbed up in the gable end of the barn and pulled out three of the funniest, fuzziest monkey-faced little brats that it has ever been my privilege to set eyes upon. They blinked, snapped their bills and hissed like a boxful of snakes. We took them to the ground and doubled up in laughter at their queer antics. They bobbed and screwed around in more funny attitudes in a minute than any contortionist I ever saw.

We found them graded in size and height as carefully as a carpenter builds the steps of a stair case. They were such lumpy looking birds It looked as if some amateur taxidermist had taken them in hand and rammed the cotton in, wad at a time with a stick, till he had the youngsters bulging out in knobs all over.

The eldest we called the colonel, but looking at him from a humanized standpoint, it seems to me he had been put together wrong, for his chest had slipped clear around on his back. At times he was a peaceable-looking citizen, but he was always wary and suspicious. He turned his back on the camera in disgust,

or sat in a soured state of silence, but one eye was always open and watching every movement we made.

We crept out one night and hid in a brush heap by the barn. It was not long before the scratching and soft hissing of the young owls told us their breakfast time had come. The curtain of the night had fallen. The day creatures were at rest. Suddenly a shadow flared across the dim-lit sky; there was a soundless sweeping of wings as the shadow winnowed back again. The young owls, by some unmistakable perception, knew of the approach of food, for there was a sudden outburst in the soap-box like the whistle of escaping steam. It was answered by an unearthly, rasping, witching screech. I thought of the time when we used to creep out in the dead of night and scare an old negro by dragging a chunk of resin along a cord attached to the top of an empty tin can. Again and again the shadow came and went. Then I crept into the barn, felt my way up and edged along the rafters to the hen-roosty old box. Silently I waited and listened to a nasal concert that was as pleasing as a cageful of musical snakes. The minute food was brought I flashed a match and saw one of the little "monkey-faces" tearing the head from the body of a young gopher.

PORTRAIT OF HALF-GROWN BARN OWL, ABOUT 45 DAYS OLD
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The barn owl kills the largest gopher with ease and celerity, and with apparently little resistance on the part of the animal. With the sharp talons firmly fastened in the gopher's back and the wings spread, the owl will break the vertebræ of the animal's neck with a few hard blows of its beak. The head is most always devoured first, either because that is a favorite part or because the destruction of the head gives better assurance of the animal's death.

The next time we climbed the cob-webbed rafters to photograph the young owls, I cautiously thrust in my hand to pull out the nearest nestling. In a twinkling he fell flat on his back and clutched me with both claws. Of all the grips I ever felt, that was most like a needle-toothed steel trap. I felt the twinge of pain as the sharp talons sank into the flesh. I cringed and the grip tightened. The slightest movement was the signal for a tenser grasp. It was the clutch that fastens in the prey and never relaxes till the stillness of death follows. I hung to the

rafters and gritted my teeth till I could wedge in my thumb and pry the claws loose.

The young owls were hardly old enough to fly, but they could raise their wings and run like a cat for the darkest corner. We had never tried the camera on such a ferocious lot of birds. They knew the art of self-defence like a profess-

HALF-GROWN BARN OWL IN FIGHTING ATTITUDE

ional prize fighter. Approach one and he was on his guard. He would turn on his back in an inkling and throw up his claws. "Come on, I'm ready," he seemed to say; and we kept our distance. The oldest one had a villainous temper; he was as much opposed to having his picture taken as a superstitious Indian. Generally he sat with his chin resting on his chest like a broken-down lawyer. Once when the photographer was least expecting it, he dropped on his trouser's leg as lightly as a feather, but with the strength and tenacity of a mad bull pup. The claws sank thru to bed rock and before they could be pried loose, they had drawn blood in three places.

ADULT BARN OWL LEAVING NEST; TAKEN ON EXPOSURE OF ONE ONE-THOUSANDTH PART OF A SECOND

Copyright photo by H. T. Bohlman and Wm. L. Finley

It is well known to scientists that all birds of prey swallow a great deal of indigestible matter such as the fur and the bones of animals and the feathers of birds. After the nutritious portions have been absorbed, the rest of the mass is formed into pellets in the stomach and vomited up before a new supply of food is eaten. By the

examination of these pellets, found about the nest or under the roost, a scientist can get a perfect index to the character of the food that has been eaten. In addition to this, one generally finds in the nest the remains of creatures upon which the young birds have been feeding.

The owls as a family are the most beneficial of predaceous birds from the economic standpoint of the farmer. With few exceptions they are nocturnal. Their eyes and ears are remarkably developed and are keenest in the early hours of the night and morning. Many harmful rodents are most active in their search for food during the night, and the owls are the natural check for this multitude. The hawk hunts by day and the owl by night and the work of the one supplements that of the other.

A pair of barn owls occupied one of the towers of the Smithsonian Institution at Washington. When the young were half grown, the floor was strewn with pellets. An examination of two hundred of these showed a total of four hundred and fifty skulls. Four hundred and twelve of these were mice, twenty rats, twenty shrews, one mole and a vesper sparrow.

A family of young owls will number from three to seven birds. It is incredible what an amount of vermin a family of owls will consume. An old owl will capture as much or more food than a dozen cats in a night. The owlets are always hungry; they will eat their own weight in food every night and more if they could get it. A case is on record where a half grown owl was given all the mice it could eat. It swallowed eight in rapid succession. The ninth followed all but the tail which for some time hung out of the bird's mouth. The rapid digestion of the Raptores is shown by the fact that in three hours the little glutton was ready for a second meal and swallowed four additional mice. If this is the performance of a single bird, the effect that a whole nestful of owls would have on the vermin of a community is self-evident.

PORTRAIT OF FULLY GROWN BARN OWL
Copyright photo by H. T. Bohlman and Wm. L. Finley

I wondered at the changes in the owl faces as they grew older. When I first saw them in white down, I thought the face was that of a sheep, and then a monkey, and then I didn't know just what it resembled. The third time we visited the nest, each youngster had a face that surely looked like some old grand-

mother dressed in a night cap. Later on, when we saw them full grown, they got to be more owl like and dignified.

An owl spreads terror among the small ground folk as a ghost among negroes. It is the owl's shadow-silent wings, his sharp, sound-catching ear and his night-piercing eyes that make him the superior of the mouse, the mole, the gopher and the rat. He fans over the field with an ominous screech that sets a mouse scampering to his hole, but his ear has caught the foot-steps; those wings are swift; those steel trap claws are always ready; his drop is sure, his grip is death.

From an economic standpoint, it would be difficult to point out a more useful bird in any farming community. Like many other birds, the barn owl deserves the fullest protection, but man is often his worst enemy.

Santa Monica, Cal.

The Percentage of Error in Bird Migration Records [1]

BY WITMER STONE

IN no branch of ornithology is it more difficult to obtain reliable data than in the study of bird migration.

It is seldom that we see the actual migration in progress, and then it is but a small fraction of the movement that comes under our observation and that often under abnormal conditions.

Consequently we are thrown back upon a comparison of the records of the occurrence, or the dates of arrival and departure of birds at various points, in any deductions that we may make as to the direction and rapidity of their migratory flights.

Without considering the possibility of error on the part of the observer there are many conditions which tend to impair the accuracy of such records, such as inability to be in the field every day during the migratory season, inability to cover the same amount of territory each day, and the recording by some observers of early stragglers which were not noted by others.

To obviate the last, suggestions have been made to record the arrival of the bulk of the species; but this at once admits the personal equation into the problem, and I find that nearly all observers differ in their interpretation of the bulk arrival, especially in the case of species which are subject to a constant increase in numbers from the first day that they are observed.

The average date of arrival based on several years' observation is more accurate as a basis of comparison, but even then there is a large probability of error.

Now most of the published tables of migration consist of the records of single observers at scattered points along the route of travel with generally large intervals between their stations.

Scarcity of competent observers made it practically impossible to secure a large number of migration records from a limited area; but the wonderful increase in the popular interest in bird study which we have recently witnessed has developed many able observers and renders the accumulation of this sort of data quite feasible.

It has been my privilege to study a series of local records of this sort kept at from 30 to 40 stations each year, all within 15 or 20 miles of Philadelphia, by a corps of observers organized by the Delaware Valley Ornithological Club.

These records are suggestive both in the apparent reduction of the percent-

[1] Read at the Twenty-third Congress of the A. O. U. in New York City, November, 1905.

age of error by a combination of many local reports and in the light which they seem to throw upon the general nature of migratory arrivals.

I have, moreover, a peculiar pleasure in presenting some of the results of my study on this occasion in as much as the first paper that I ever read before the A. O. U., fifteen years ago, dealt with the migration records kept at Philadelphia by the seven founders of the Delaware Valley Ornithological Club which had then just been organized.

The plan of recording migration which is now followed by our migration corps, as well as the detailed results of the work, have been published each year in *Cassinia*, the annual publication of the Club; but, as many of you probably have not had an opportunity of consulting it, I shall give a brief outline of the plan.

The work is confined to the spring migration, as the study of the fall movement has proved impracticable except in the case of a very few observers.

Schedules are mailed in February to all former observers and to probable recruits, and contain the printed names of 90 migrants, with blanks for the date of arrival after each, and a blank column for the entry of additonal species, while remarks and supplementary data are to be written on the back. The convenience of having each species in exactly the same position on every schedule can be appreciated by any one who has done any compiling from such records. The *first* date of observation *only* is entered in the arrival column but others may be given under remarks, especially when the first arrival was an advance straggler. The schedules are returned in June, and as soon as the report for the year is prepared and published, each observer receives a separate, thus keeping up his interest in the study and keeping him in touch with his fellow workers.

From the records of the past four years I have selected the dates of arrival of a few of the most common and easily recognized species as reported by some of the most reliable observers, that is, those who were most constantly in the field. From these we may draw some interesting deductions.

In the first place the diversity of dates is considerable; even the average of arrival for four years is by no means uniform, and one can readily see that any calculation on the speed of migration in a general study would vary considerably according to which station we should quote as indicating the date of arrival at Philadelphia. Indeed the diversity is sometimes as great as that between points separated 200 miles or more, as given in some of the published records. [See Table I.]

Tabulating the records in another way and using the whole series we find that there are usually scattering reports of arrival from one or two stations. And then on one or two days the species reaches nearly all of the other stations. In other words the bulk of the arrivals are massed on one or two days. [See Table II.]

It seems to me that the indications are that early arrivals drop down here and there thruout the area covered by our observers, sometimes being first recorded from the stations farthest up the river or farthest back on the uplands; then comes the bulk movement some days later which marks the advent of the species at all the other stations.

In other cases there is no well marked bulk movement, and the species is reported arriving day after day at one station or another until it is spread over the whole area. In such instances it may be seen regularly by one man some days before it appears in the territory covered by his neighbor only a short distance away.

This method of tabulating our data is probably the most satisfactory, but as an illustration of how the combination of several records reduces the percentage of error, take sixteen stations within ten miles of Philadelphia in 1903, and we find a range of a week, or more, variation in the reports of arrival of six common species;

combining the same records into four centers or clusters of observers, north, south, east and west of the city, and selecting the earliest date for each species in each of the four groups, we find the range of variation reduced to a day or two. [See also Table III.]

In this way it can readily be seen that every report, no matter how fragmentary, is of value. It may contain one or two observations not noted at any other of the neighboring stations, while its deficiencies are made up in their records.

I do not propose to quote a host of dates and figures, which are uninteresting and hard to follow, but I trust I may have made clear to you the value of combined local records and also the probability that the correct statement of migration at any given point will not be the citation of a single date but by some such statement as follows: "Stragglers of a certain species were arriving at Philadelphia from April 23 to 27 and the bulk movement occurred on April 28 and 29."

Migration constantly invites us to theorize and generally we find that we are working with very slender chains of evidence. What we need in the future, it seems to me, is more detailed and accurate data; and the plan of organizing large corps of observers at several important centers, as above described, is suggested as a means toward that end.

TABLE I. Showing average (4 years) date of arrival at four stations within ten miles of Philadelphia and three stations over twenty miles distant.

Station	A	B	C	D	E	F	G
DISTANCE FROM PHILADELPHIA	6 mi.	8 mi.	10 mi.	10 mi.	21 mi.	22 mi.	33 mi.
Chætura pelagica	Apr. 19	Apr. 22	Apr. 23	Apr. 23	Apr. 18	Apr. 21	Apr. 23
Piranga erythromelas	May 6	May 9	May 8	May 6	May 9	May 9	May 8
Seiurus aurocapillus	Apr. 30	May 3	May 2	Apr. 28	Apr. 29	Apr. 30	May 4
Hylocichla mustelina	Apr. 27	May 3	Apr. 30	Apr. 29	May 1	Apr. 30	Apr. 30
Sayornis phœbe	Mch. 14	Mch. 20	Mch. 27	Mch. 18	Mch. 24	Mch. 20	Mch. 27

TABLE II. Showing how first arrival reports from stations about Philadelphia are massed on certain days.

Chimney Swift (*Chætura pelagica*).

1903	1904	1905
April 12 arrived at 1 station	April 15 arr. at 2 sta.	April 13 arr. at 1 sta.
17 " " 1 "	21 " " 1 "	18 " " 2 "
19 " " **6** "	22 " " 2 "	20 " " **9** "
20 " " **6** "	23 " " 1 "	21 " " **16** "
21 " " 2 "	24 " " **8** "	22 " " 2 "
22 " " 3 "	25 " " **16** "	23 " " 3 "
23 " " 3 "		24 " " 4 "

Wood Thrush (*Hylocichla mustelina*).

1903	1904	1905
April 23 arr. at 1 sta.	April 22 arr. at 2 sta.	April 23 arr. at 1 sta.
30 " " **6** "	26 " " 1 "	24 " " 2 "
May 1 " " **1** "	28 " " 1 "	25 " " 2 "
2 " " **6** "	29 " " **6** "	26 " " 1 "
3 " " 2 "	30 " " **7** "	27 " " 1 "
4 " " 2 "	May 1 " " **6** "	28 " " **5** "
5 " " 4 "		29 " " **2** "
		30 " " **9** "
		May 1 " " 2 "

TABLE III. Illustrating method of combining data from 12 local observers into several "centers."

Chætura pelagica, 1902: April 19 (1 sta.), April 21 (1), April 22 (5), April 23 (1), April 24 (2), April 26 (1), April 27 (1). Grouping the stations in four sections, or "centers," and taking the earliest date for each section, we have: Section A, April 21; B, April 22; C, April 19; D, April 22.

Toxostoma rufum, 1902: April 22 (2), April 23 (1), April 24 (4), April 25 (1), April 26 (2), April 27 (1), May 1 (1). Grouping them we have: Sect. A, April 22; B, April 22; C, April 23; D, April 24.

Philadelphia, Pa.

Land Birds of San Onofre, California

BY JOSEPH DIXON

IN the extreme northwestern corner of San Diego County, California, there is an old Mexican grant which still remains undivided and unsettled. The general topography of this locality consists of low rolling hills which increase in height and ruggedness as they extend inland, until they terminate in the San Onofre Mountains which have an altitude somewhat less than 3000 feet.

The San Mateo and San Onofre rivers drain nearly all of this part of the County. These rivers widen out near their mouths forming lagoons and 15 or 20 acres of salt marsh. Extending inland along each of these river valleys there stretches an almost continuous grove of sycamores. The north sides of the hills are covered with live oaks and a tangled growth of poison oak and lilac brush. But near the coast the southern slopes, which lie fairly exposed to the sun, are covered with a sparse growth of "old man" and cacti.

The whole country is one vast cattle range on which hunting has been, and is, prohibited, and as the conditions are unusually favorable there is an abundance of bird life which offers some exceptional opportunities to the bird student. For this reason Philip Pinger and myself have made three trips to this locality. The first trip was made May 27 to 30, 1904; the second, March 25 to April 2, 1905; and the last visit extended from March 23 to April 1 of the present year.

There had been a series of very dry seasons previous to our first visit and we found that the scant growth of grass had withered by May. The unusually abundant rains of the last two seasons have worked a wonderful change in the appearance of the country. The cactus which was formerly so conspicuous on the southern slopes is now hidden by a luxuriant growth of flowers and chilicothe vines. These seemingly innocent beds of flowers sometimes give the collector a painful surprise as he finds a large knob of cholla cactus tightly attached to his leg. These cactus patches are especially formidable to the collector as he tramps wearily campward in the darkness of evening.

We made several short trips up and down the coast and twice we cut across the mesa and went up the river valleys for an all-day jaunt. But all of our observations were made within a radius of six miles of our camp near the railroad station called San Onofre.

American ravens were often seen flying in pairs across the valley or up the coast. They often circled around camp to see if they could find scraps of meat that had been thrown out. This is the only locality in which I have found this species to be tame. It was a daily occurrence to see four or five ravens hopping around the scrap heap near the tent and once we counted six ravens feeding in the door yard within a few feet of a fisherman's tent. At another time we counted ten ravens and thirty or forty turkey vultures around the fresh carcass of a cow. This carcass was picked to the bone in three days. A male raven shot March 24, 1906, had a meadow mouse, one Jerusalem cricket and a centipede 106 millimeters long, in its stomach. We found several ravens' nests along the seacoast. These nests were situated in potholes usually near the tops of the cliffs. On March 24 we flushed a raven from a nest which was about 75 feet from the top and 60 feet from the bottom of the cliff. But we failed to secure the eggs.

Among the large number of species found, none were more conspicuous by day and night than the hawks and owls. We found the western red-tail and sparrow hawks and the Pacific horned and barn owls especially abundant. In

one valley in a distance of six miles we found twenty-two hawks' nests. Seven of these nests were occupied by red-tails, three by horned owls and one by a red-bellied hawk. Each pair of red-tails usually had two and sometimes three nests, for they seem to occupy different nests from year to year. Two nests were often found built close together and in one instance there were three nests in one clump of trees.

These twenty-two nests were all located in sycamores which often stood at a bend in the creek or near the edge of the grove. By actual measurement we found that the average height from the ground of twenty-two nests was fifty-five feet. The extremes were seventy-five and forty-three feet. We estimated that there was a pair of hawks to every one-half square mile of territory. What becomes of the offspring in this densely populated district is a problem that I have been unable to solve. But some of them evidently stay near their birthplace as we found that out of seven pairs, two pairs had moved in since last year.

Each pair of hawks had its own squirrel pasture and the birds resented the trespassing of other hawks on their domain. The remains of gophers, ground squirrels, meadow mice, young cottontails and two species of snakes, the striped racer and gopher snake, were found in red-tails' nests, but ground squirrels seemed to be their principal diet. I found as many species of small mammals in hawks' and owls' nests in two days as I did by trapping for a week.

In 1905, between March 25 and April 1, we found thirteen pairs of red-tails nesting, but none of the eggs had hatched up to that time. One set of four, four sets of three, seven sets of two and one incomplete set of one were found, making a total of thirteen sets and thirty-one eggs. This year fourteen pairs of red-tails were located.

On March 28 a nest was found that contained two eggs and one young bird. One of these eggs was moving about in the nest and when I turned it over I found that the young bird had its bill out and was wriggling and squeaking feebly. The hole in the egg attracted my attention as it had apparently been made from the outside instead of the shell being pushed out from within; for the pieces of shell about the edges of the hole all pointed inward instead of out, and the hole was not big enough for the young bird to stick its head out and then draw it back thus drawing the pieces of shell with it. I have noticed this same thing before and believe that sometimes the old bird pecks the hole, thus aiding the youngster to escape at the proper time.

Another nest was found just ready for eggs on March 30. The other twelve nests contained the following: two sets of four, four sets of three and six sets of two. In 1905 twelve sets made a total of twenty-nine eggs. In 1906 twelve sets made a total of thirty-two eggs. Thus it will be seen that there were ten per cent more eggs laid this year than there were last year. In a number of cases the bird that laid two eggs last year laid three this year and the birds that laid the sets of four this year laid only three eggs last year.

It is interesting to note that the eggs as well as the sets were larger this year than last. The average measurements of twenty-six eggs last year were 2.36 x 1.78 inches, while this year the average of thirty eggs was 2.39 x 1.84 inches. The average number of eggs in a set was 2.38 last year and this year it was 2.66. The average measurements of fifty-seven eggs was 2.38x1.81 inches and an average based on twenty-five sets showed that there were 2.52 eggs in each set. The largest set of eggs found measured 2.45x2.00, 2.56x1.95, 2.46x1.99 inches, while the smallest eggs measured 2.23 x 1.73, 2.30 x 1.78 inches. The smallest number of eggs in a complete set was two and the largest four.

Five pairs of birds were watched to see if they would lay eggs of the same number, size, shape and markings from year to year. Three pairs of birds occupied the same nests during the two years and the other two pairs each moved to other nests in the same grove. The individuals had certain characteristics, as dark or light plumage or a peculiar harsh note while one pair made themselves conspicuous by their silence; so identification was quite certain and we were reasonably sure that we did not get the pairs confused.

In 1905 one pair produced a set of two eggs which measure 2.53 x 1.78, 2.55 x 1.83 inches. One egg of this set was covered with clay colored markings which merged together forming a hazy cloud around the large end. The other egg was similar to this but the markings were of a vinaceous buff tint and surrounded the small end. This year a set of three eggs laid by the same bird measure 2.38 x 1.81, 2.32 x 1.76, 2.42 x 1.78 inches. These eggs were evenly covered with splashes that vary in size from a pin point to 25 square millimeters and fade from a cinnamon rufous to heliotrope purple. Thus it will be seen that these two sets differ, in number, size, shape and markings.

Another pair laid three eggs last year which measure 2.34x1.87, 2.33x1.88, 2.32x1.87 inches. Two of these eggs were covered about the little end with chestnut colored spots that were arranged in a concentric position around the small end. These spots were large and gradually faded from chestnut to hazel as they approached the end of the egg. The other egg had only a few scattering hazel markings. This year this pair laid four eggs which have almost identically the same ground color, shape and markings as last year's eggs. The eggs measured 2.28x1.86, 2.29x1.83, 2.29x1.84, 2.30x1.84 In this instance the bird laid the same type of eggs for two consecutive years.

The third pair laid a set of two eggs in 1905. The ground color of these eggs was almost white. One egg was covered about the small end with clear-cut chestnut splashes that centered about the small end of the egg. The other egg had a few very small vinaceous spots scattered evenly over its surface. This year this pair laid a set of three eggs. The ground color of this set was darker than that of the other set. One egg was covered about the small end with heavy burnt umber splashes. The second egg had a number of large brown spots on the large end, while the third egg was covered over the large end with indistinct clay colored splashes. The two sets measure 2.35x1.82, 2.37x1.83 and 2.33 x 1.84, 2.28 x1.87 (the third egg was broken).

The fourth pair laid two eggs this year as well as last year. The set last year had a dirty ground color and was marked with a few scattering hazel smudges. The eggs laid this year were nearly exactly the same in size, ground color, incubation and markings.

The last pair laid a set of two in 1905. These eggs were small (2.23x1.73, 2.30x1.78) and had a few heavy spiral vinaceous spots on the large end. Another set from the same pair of birds measure 2.33x189, 2.24x1.82 inches. One of these eggs was particularly handsome as it was heavily marked on the little end with heavy clear-cut cinnamon-rufous splashes. The other egg was similar only the markings were not so brilliant.

These observations show that some pairs of red-tails lay the same shape, size, number and marked eggs, for two consecutive years. But in the present instance the majority did not do this.

In 1904 we saw several Pacific horned owls, but they seemed to have almost disappeared in 1905. I was also informed that horned owls were rarely met with that season in the central part of the County, where they had formerly been com-

mon. It seemed as tho a general exodus had taken place. This year we found four pairs of horned owls, all of which were nesting in red-tails' nests. On March 29 a set of two sterile eggs were taken from a red-tail's nest sixty feet up in a sycamore. The bird flushed when we were about 150 yards from the nest. This timidity was probably a personal characteristic of that individual as they are usually hard to flush. A partially devoured wood rat was found on the edge of this nest. On March 30 two other nests were found both containing downy young about a week old. As I was climbing up to one of these nests the old bird flopped off just as I reached the base of the nest while her faithful spouse sat snoozing away, hunched up on a limb that extended out beyond the nest. A fourth bird was flushed but we did not investigate the contents of the nest. Among other things found in horned owls' nests were the remains of meadow mice, gophers and a brown-footed wood-rat.

Several barn owls' nests were located in hollow sycamores and crannies in the cliffs. One nest which on March 25, 1905, contained four eggs and one newly hatched young held three half-grown young on March 25, 1906. California screech owls were not at all plentiful and no nests were located.

A pair of burrowing owls were seen on March 30. One was sitting at the entrance of a deserted ground squirrel burrow while the other perched on a newly installed telephone pole which was evidently a welcome improvement in their domain as it afforded the only elevated perch in the neighborhood.

American sparrow hawks were common in the sycamores where they nested in natural cavities and in old flicker holes. A set of five fresh eggs was found March 27, 1903, and a nest with four full-fledged young was located on May 29, 1904.

Red-bellied hawks made themselves conspicuous by squalling as they flew about over the northern oak-covered slopes. The crows and red-bellied hawks usually nested in the same locality and it was hard to distinguish the hawks' nests from the crows' nests as the birds were shy and often flushed before we located the nests. On April 1, 1905, we found a nest with the old bird sitting. The nest was placed up against a trunk of a large sycamore that towered up above a dense grove of live oaks. The nest had evidently been used for several years previously and had just been relined with sycamore bark and green leaves. The nest contained three handsome eggs in which incubation had just started. The ground color of all the eggs was clear white. Two of the eggs have a series of heavy bay blotches about the larger end. One of these eggs was especially well marked being the handsomest egg out of twenty-three sets and sixty-five eggs. The third egg had only a few pale heliotrope purple shell markings.

On March 30, 1906, I found another nest that I had missed the previous year. This nest was up against the main branch of a tree that ran out over a creek. The bird flushed when I rapped on the tree trunk. The nest was lined with fine sycamore bark and contained three eggs of the regulation type. The six eggs measured 2.06x1.57, 2.13x1.63, 2.07x1.60 and 2.18x1.67, 2.16x1.67, 2.18x1.70. A male red-bellied hawk shot April 1, 1905, had one Jerusalem cricket and two fence lizards in its stomach.

About five miles back from the coast there was a large crescent-shaped sandstone cliff that had numerous potholes in its face which from a distance gave it the appearance of having had the small pox. It appeared as tho the whole side of the hill had slumped off into the canyon leaving a cliff about 150 feet high. On April 1, 1905, we discovered that a pair of duck hawks were nesting in one of the pot-holes. But the cliff bulged out just above the nest and as we had no rope we

had to leave the nest unexplored altho the female was sitting and we were sure that there was a set of eggs there.

We again visited this nest on March 28, 1906, and we were prepared this time. Pinger fired his gun and the male flushed when we were about fifty yards below the nest. Both hawks were rather quiet and did not swoop down at us much, but wreaked vengeance on some ravens and innocent turkey vultures that came too near the cliff. The nest cavity was forty-two feet below the bush to which the rope was tied. This cavity was about as large as a wash tub and faced toward the south. The three eggs were covered with mud, and it was evident that they had been quite wet. There was absolutely no attempt at nest building, the eggs being deposited on the damp sand. The embryos in the three eggs had begun to feather out so the eggs must have been laid about the middle of March. The eggs have an unusually light ground color and measure 1.99x1.53, 2.03x1.52 and 2.03x1.58. There were large numbers of valley quail and mourning doves in that immediate vicinity and we saw bunches of quail feathers near the duck hawk's nest.

On March 25, 1906, as we were strolling up the beach we heard a Pasadena thrasher singing, and looking around we discovered him perched on a small bush that grew right at the base of the cliff. It was raining at the time and we approached quite near the bird before he suspended his merry song and slipped off to disappear among some bushes close by. I was quite surprised to find this bird on the beach as I had considered it an inland bird and have never seen it so near the ocean before.

During our stay in 1905 we became interested in a flock of valley quail that came to roost every night in a small elder tree that grew within thirty feet of our camp. Each evening I recorded the time that the quail came to roost and found that during a period covering eight days, their time of going to roost did not vary more than ten minutes either way, from 6:15 o'clock.

On rainy or cloudy days they were seven or eight minutes early and on bright clear afternoons they were a little late but they were so regular in their habits that when they came to roost I knew it was 6:15 o'clock without looking at my watch.

In May 1904 we found Texas nighthawks abundant about the marsh in the early evening. They began to appear shortly after sundown and by the time darkness fell there were at least 300 birds diving down at each other or skimming swiftly over the water catching insects. Altho these birds were so abundant in the evening we never succeeded in flushing any during the daytime so I supposed that they must have come from some distance to this feeding ground.

The abundance of insect life about the marsh furnished the food supply for a large number of swallows. In March of both 1905 and 1906 we identified the barn, rough-winged, violet-green, cliff and white-bellied tree swallows, as well as the western martin. The rough-winged and barn swallows were not numerous and were evidently just transients on their way north during the spring migration. The other species were very numerous. The cliff swallows were building on the section house on March 30, 1906. A set of four fresh eggs of the white-bellied tree swallow was found in a woodpecker's hole in an elder bush on May 30, 1904.

A set of four fresh eggs of the western martin was found in a natural cavity of a sycamore on May 30, 1904. The nest was made of fine grass and a few bits of dry sycamore leaves. Another nest was found on March 27, 1905, that was nearing completion. This nest was about twelve feet up in a hole in a sycamore. This year, the last of March, we found six pairs of martins that were selecting nesting

sites. In one place there were a number of California woodpeckers' holes in a tall dead sycamore. Here we found three pairs of martins fluttering in and out of the woodpeckers' holes and if their ceaseless twittering was any expression of their feelings they must have been exceedingly well pleased with their new domiciles.

The following is a list of the land birds that were identified. The sea-birds, waders and ducks are not incorporated in this list because those that were identified were not particularly noteworthy and because the identification of several species was unsatisfactory.

Lophortyx californicus vallicola. Valley Quail. Very rare in 1904, but bred abundantly in 1905 and 1906, when the rainfall was copious.

Zenaidura macroura. Mourning Dove. Common, especially in 1906.

Cathartes aura. Turkey Vulture. Common everywhere all the time.

Accipiter cooperi. Cooper Hawk. Not common; two were seen during the last week in March, 1905.

Buteo borealis calurus. Western Red-tail. Was found breeding very commonly in 1905 and 1906.

Buteo lineatus elegans. Red-bellied Hawk. Several pairs seen and two nests located.

Aquila chrysaetos. Golden Eagle. A single individual was seen in March, 1905.

Falco peregrinus anatum. Duck Hawk. One pair found nesting on March 28, 1906.

Falco sparverius. American Sparrow Hawk. Breeds very commonly in the sycamores.

Strix pratincola. American Barn Owl. Common; two nests were found containing young in March, 1905.

Scops asio bendirei. California Screech Owl. Only three individuals were seen.

Asio magellanicus pacificus. Pacific Horned Owl. Rare in 1905, but four pairs were found breeding in 1906.

Speotyto cunicularia hypogæa. Burrowing Owl. Not common; only two pairs were seen.

Geococcyx californianus. Road-runner. Single individuals were seen on May 29, 1904, and on March 28, 1906.

Dryobates nuttalli. Nuttall Woodpecker. Very common in the elder bushes where they breed.

Melanerpes formicivorus bairdi. California Woodpecker. Not common; a few pairs bred in the sycamores.

Colaptes cafer collaris. Red-shafted Flicker. Common in the sycamores where they bred.

Chordeiles acutipennis texensis. Texas Nighthawk. Abundant about the marshes from May 27 to 30, 1904.

Aeronautes melanoleucus. White-throated Swift. Several pairs were seen near the duck hawks' nest in 1905 and 1906.

Trochilus alexandri. Black-chinned Hummingbird. Quite common in the sycamores May 27 to 30, 1904.

Selasphorus rufus. Rufous Hummingbird. A single male, evidently a migrant, was seen on March 31, 1905.

Tyrannus verticalis. Western Kingbird. Breeding commonly in the sycamores in May, 1904.

Myiarchus cinerascens. Ash-throated Flycatcher. Two pairs were seen the last of May, 1904.

Sayornis nigricans. Black Phœbe. A pair was building on the section house on March 25, 1906.

Empidonax difficilis. Western Flycather. A single specimen was secured on March 27, 1905.

Otocoris alpestris actia. California Horned Lark. Several pairs were seen on the mesa, May 29, 1904.

Aphelocoma californica. California Jay. Rare; only three or four individuals were seen during the three trips.

Corvus corax sinuatus. American Raven. Common; breeds on the cliffs along the sea shore.

Corvus brachyrhynchos hesperis. California Crow. Common in the live oak groves where they breed.

Agelaius phœniceus neutralis. San Diego Red-wing. Abundant in the salt marsh in May, 1904, and March, 1905.

Sturnella neglecta. Western Meadowlark. Only a few scattering individuals were found.

Icterus bullocki Bullock Oriole. Bred commonly in the sycamores in May, 1904.

Euphagus cyanocephalus. Brewer Blackbird. Bred commonly; a full-grown young one was found on May 28, 1904.

Carpodacus mexicanus frontalis. Linnet. Not at all common; breeds.

Astragalinus tristis salicamans. Willow Goldfinch. Common about the marsh in May, 1904.

Astragalinus psaltria hesperophilus. Green-backed Goldfinch. Also seen about the marsh in May, 1904.

Passerculus sandwichensis alaudinus. Western Savanna Sparrow. A single specimen was secured March 27, 1905.

Chondestes grammacus strigatus. Western Lark Sparrow. Several pairs were seen in the sage brush in March, 1905.

Zonotrichia leucophrys gambeli. Intermediate Sparrow. A few straggling individuals of this winter visitant were found March 27, 1905.

Junco hyemalis thurberi. Sierra Junco. A pair were noticed among the low bushes on a dark, damp, northern, oak-covered slope on March 27, 1905.

Melospiza cinerea cooperi. San Diego Song Sparrow. Common on the marsh; a nest was found containing three eggs on May 29, 1904.

Melospiza lincolni. Lincoln Sparrow. A single specimen was secured on March 26, 1902.

Pipilo fuscus senicula. Anthony Towhee. Quite common; a nest was found March 26, with three eggs in it.

Zamelodia melanocephala. Black-headed Grosbeak. A few individuals were seen May 29, 1904,

Guiraca cærulea lazula. Western Blue Grosbeak. One female was secured on May 29, 1904.

Progne subis hesperia. Western Martin. Common; found nesting on all three visits.

Petrochelidon lunifrons. Cliff Swallow. Common about the marsh.

Hirundo erythrogaster. Barn Swallow. Migrant; one was secured May 29, 1904, and another seen March 26, 1906.

Iridoprocne bicolor. Tree Swallow. Abundant; one nest was found in 1904.

Tachycineta thalassina lepida. Violet-green Swallow. Migrant; one of the most abundant birds in the locality, in March of both 1905 and 1906.

Stelgidopteryx serripennis. Rough-winged Swallow. Migrant; several were secured on March 30, 1905.

Vireo gilvus swainsoni. Western Warbling Vireo. Not common; one specimen was secured May 28, 1904.

Helminthophila celata lutescens. Lutescent Warbler. One migrant was secured March 26, 1905.

Dendroica auduboni. Audubon Warbler. A few stragglers were seen during March, 1905 and 1906; the majority had evidently departed.

Geothlypis trichas scirpicola. Tule Yellowthroat. Common in the tule patches.

Mimus polyglottos leucopterus. Western Mockingbird. Quite common among the "cholla" cactus where it breeds.

Toxostoma redivivum pasadenense. Pasadena Thrasher. One individual was seen on March 25, 1906.

Heleodytes brunneicapillus couesi. Cactus Wren. Several pairs were seen in the cactus where a set of eggs was found March 27, 1905.

Troglodytes aedon parkmani. Western House Wren. Common in the sycamores where several nests were located.

Bæolophus inornatus. Plain Titmouse. A single individual was secured March 28, 1906.

Chamæa fasciata henshawi. Pallid Wren-tit. One pair was seen in the brush on the hillside in March, 1905.

Psaltriparus minimus. California Bush-tit. One flock was encountered in some willows May 29, 1904.

Sialia mexicana occidentalis. Western Bluebird. A nest with large young was found May 30, 1905.

Throop Polytechnic Institute,
Pasadena, Cal.

Notes on Birds Observed While Traveling From Yokohama to Manila

BY RICHARD C. MCGREGOR

I VENTURE to offer the readers of THE CONDOR the following notes made while traveling from Yokohama, Japan, to Hongkong, China, on the T. K. K. "America Maru," and from Hongkong to Manila on the steamer "Rubi." The point of particular interest is that while gulls were abundant at and between Yokohama and Hongkong none of them followed the ship to Manila. *Larus ridibundus* is the only gull known to occur regularly in Philippine waters; only one other, *Larus vegæ*, is recorded, and this from a single specimen taken near Manila. Sea birds of all kinds are extremely scarce in Philippine waters; thus but two Tubinares and eleven Laridæ are known from the Philippines against eleven Tubinares and twenty-one Laridæ from Japan. Similar proportions are found when all the water birds are considered. McGregor and Worcester enumerate but 101 water birds in their "Hand-List of Philippine Birds" (1906), while more than twice that number are given by Seebohm in "The Birds of the Japanese Empire" (1890).

Yokohama Bay, February 19.—During our stay here we had very fine clear

and cold days. Mt. Fuji was covered with snow and was visible all day. There are two species of gulls about the harbor in great numbers; the small one feeds in compact flocks and looks like the Bonaparte gull, the larger and more numerous species resembles the glaucous-winged gull. The black kites, *Milvus ater melanotis* (T. and S.), are few in numbers about the bay. We left Yokohama at 11 a. m. for Kobe via the Inland Sea. None of the small gulls followed us out of the bay but the large gulls were with the ship until dark. It is amusing to see a gull reach forward with one foot and scratch his head without disturbing his flight; and I am always surprised to observe the apparent ease with which they keep up with a ship. The "America Maru" makes about fourteen knots, and yet these large gulls were flying certainly not less than three times that speed, for they continually crossed and recrossed our course and often circled backward to come up with us again. It would be interesting to make trials with a fast motor boat or turbine steamer to ascertain to what extent gulls could keep up. Gulls, however, are slow compared with albatrosses which take side trips of much greater extent and often rest on the water with every appearance of wondering why the ship is such a slow thing.

February 20—Arrived at Kobe about noon; both large and small gulls here in equal numbers. *Milvus* in great numbers, fully twenty over the ship at times. Left Kobe at midnight.

February 21—This morning very foggy in Inland Sea; three or four large gulls following ship; a few others passing in various directions. A diving bird was occasionally seen. A dozen or more gulls following in the afternoon.

February 22—Arrived at Nagasaki early this morning; a few crows and large gulls about the shipping; *Milvus* very numerous. There are usually some interesting birds in the markets here. Today I saw the following:

Turdus pallidus and *T. obscurus*.—These two thrushes were abundant; in color pattern they resemble the American robin but they are lighter colored and smaller. Another species which I noted as ruddy in color I cannot name.

Geocichla varia.—This is a large spotted thrush; not abundant.

Hypsipetes amaurotis.—This bulbul or fruit thrush is a common species in the market.

Turtur orientalis ?—Numerous doves of this genus were seen and the species is probably correct.

Treron sieboldi.—Several examples of this green tree-dove were examined.

Phasianus sp.—The pheasants noted could not be identified on sight.

Ampelis japonicus.—The Japanese wax-wing was seen in some numbers; probably 40 to 60 all told. It is an attractive species having the tip of tail rose-red and the greater wing-coverts decorated with dull red. This species has not been seen with sealing-wax-like tips to the secondaries.

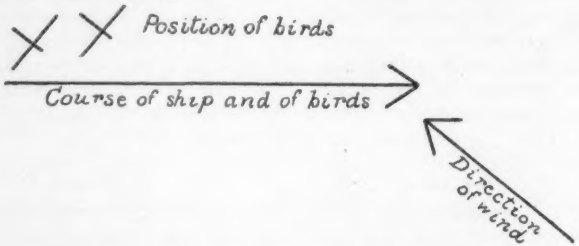
Gallinago solitaria japonica.—I saw a few snipe which I took to have been of this race.

Rostratula capensis.—The curious painted snipe was represented by a single specimen.

Beside the above, two species of larks (*Anthus*) and a duck (*Anas*) were seen. When at Nagasaki in November, 1901, I purchased in the market a jay (*Garrulus japonicus* (T. and S.), and a specimen of the remarkable Mandarin duck (*Aix galericulata* Linn.) both of which I still have among thrushes and bulbuls purchased at the same time.

At 3 p. m. we got under way for Shanghai; two hours later a dozen large gulls were following the ship.

February 23—Heavy sea and strong head wind; no birds of any kind seen up to breakfast time. 3:30 p. m. 3 gulls following. Altho the wind is on our bow and the gulls are obliged to head into it they move forward on the ship's course. The diagram will make this plain.



February 24—Anchored in the Yangtze River at 12 last night. Altho the anchorage is 30 or 40 miles from the mouth, this river is so wide that it appears as if we were in a great bay. The water is fairly thick with yellow sediment which is carried far to sea and discolors the China Sea for many miles. The erosion by such a stream must be enormous. Nothing seen in the way of birds except a few gulls. The next day gulls are more numerous.

February 26—Left river and ran down China coast; 100 or more gulls following as we are passing among two groups of small islands, the Chu San and Fisherman Islands. These islands and the adjacent coast were the hot-bed of Chinese pirates until steam navigation and the machine gun put them out of business. The islands are now inhabited by Chinese fishermen whose junks can be seen dotted over the water in all directions.

February 27—Warmer; smooth sea; 20 to 30 gulls.

February 28—Fine smooth sea; many gulls on hand. There are numerous small islands off shore; some of these should be investigated for nesting colonies of sea birds.

March 1—Hongkong; raining and cold in great contrast to the extreme heat we experienced here last August. *Milvus* is over the water here in small numbers and two individuals hang around the clock tower in the center of town.

March 3—Left Hongkong for Manila. Many hawks about the bay; no gulls seen until we neared entrance of harbor when a few picked us up and followed until late in the afternoon.

March 4—Gulls must have left us last night as none seen today nor afterwards.

March 6—Dropped anchor in Manila Bay late last night.

Manila, P. I.

"Atratus versus Megalonyx"

BY ROBERT RIDGWAY

IT gives me both pleasure and pain (especially the latter) to say that, notwithstanding the opinion which I expressed in the March number of THE CONDOR, I now believe Mr. Grinnell and Mr. Swarth were justified in considering my *Pipilo maculatus atratus* a synonym of *P. m. megalonyx* (Baird). Mr. Swarth has kindly sent me additional specimens of both the Southern California and the Rocky Mountain forms for examination, and these seem to show that the type of *P. megalonyx* is probably a male, in its first autumn or winter, of the resident bird of Southern California, and not, as I thought, of the Rocky Mountain form which has for so many years been known as *P. m. megalonyx*. The latter, therefore, should, I believe, be known as *P. m. montanus* Swarth.

Washington, D. C.

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NOTES AND NEWS

A very unfortunate accident which might easily have resulted even more seriously has incapacitated Mr. Wm. L. Finley for further camera work this summer. Messrs. Finley and Bohlman went to San Clemente Island on May 21st, and the next day were provided with horses by the sheep-herders resident on the Island. A search was begun in the afternoon for the purpose of locating bald eagle and osprey nests in convenient positions for photographing. Finley had found a satisfactory eagles' nest, and was on his way back at a rapid gait to intercept Bohlman, when the horse he was riding stumbled and fell headlong, throwing Finley violently face downward against the ground. His lower jaw was fractured in two places, several teeth broken, tongue and face badly lacerated, and left wrist sprained, besides numerous lesser bruises. With all this injury, Finley was able to remount his horse and get back to camp where Bohlman found him and took him in charge. A launch ride of twenty-five miles at night over a rough sea to Avalon, and the steamer and railroad trip to a Los Angeles hospital the next day, were followed by the sewing up of wounds and setting of bones without the use of anæsthetics. This is surely a case of GRIT! The hardships and risks entailed in obtaining the photos and life histories which have appeared in THE CONDOR and other magazines are scarcely realizable by the comfortable reader. And yet they are not feared by the field naturalist, whose very enthusiasm seems to render him blind to dangers. Finley, who is now mending rapidly, says: "We have had to give up the eagles for this year, but I'll get them yet. I believe there are great chances on Clemente."

Mr. Robert E. Snodgrass, who was in San Francisco at the time of the disaster and lost nearly all his possessions, is back at his old home in Ontario, San Bernardino County. He is doing some line drawings of birds and nests, for a forth-coming book by Jordan and Kellogg.

The Audubon Society of California was formally organized at the Los Angeles Chamber of Commerce, May 31, 1906. This regular State organization will cooperate with the National Committee of Audubon Societies at New York, and also have general supervision over the work of the local societies. An important meeting is planned for the early autumn when a definite plan of work will be decided upon. The officers elected at the initial meeting were: President, David Starr Jordan; Vice-Presidents, Prof. C. F. Holder and Dr. F. W. D'Evelyn; Secretary, W. Scott Way. It is the purpose of this organization to further the protection of our native birds in every way possible, to distribute educational leaflets among our schools, and to acquaint young people with bird-life in general, so that it may be respected and cherished. A very commendable endeavor is that to urge the establishment of forest reserves as game refuges, where no hunting whatever will be allowed at any time.

We learn that the "*Auk* Index" is in the hands of the printer. The work was compiled under the direction of Dr. Dwight who has been occupied upon it for several years. Its great value is realized by those who have had to search for records of a bird thru the indexes of the 30 volumes of *The Auk* which have appeared up to 1906, a tedious process when it has to be often repeated.

Directory of Members of the Cooper Ornithological Club

Revised to June 1, 1906
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Ridgway, Robert, 3413 13th St., N. E., Brookland, D. C. 1905.

ACTIVE MEMBERS

Adams, Ernest, Clipper Gap, Placer Co. 1896.
Anderson, Malcolm P., care of British Consul, Nagasaki, Japan. 1901.

Applegarth, Miss May S., Haywards. 1905.
Appleton, J. S., Simi, Ventura County. 1901.
Arnold, Dr. Ralph, U. S. Geological Survey, Washington, D. C. 1893.
Atkinson, Wm. L., 28 E. Santa Clara St., San Jose. 1899.
Bade, Wm. F., Box 317, Berkeley. 1903.
Bailey, Henry F., 94 Pacific Ave., Santa Cruz. 1902.
Bailey, H. H., 54 St., Newport News, Va. 1903.
Bailey, Vernon, Dept. Agriculture, Washington, D. C. 1904.
Barnwell, Reginald, Alhambra. 1904.
Bay, J. C., Stella, Shasta Co. 1903.
Beal, Prof. F. E. L., Haywards, Cal. 1903.
Beck, Rollo H., Berryessa. 1894.
Bishop, Dr. Louis B., 356 Orange St., New Haven, Conn. 1904.
Bohlman, Herman T., 46 N. 9th St., Portland, Ore. 1903.
Bolton, A. L., 1700 Bonte Ave., Berkeley. 1897.
Boring, Miss Ora, 31 W. Willow St., Stockton. 1901.
Bowles, C. W., 401 So. G St., Tacoma, Wash. 1903.
Bowles, J. H., 401 So. G St., Tacoma, Wash. 1903.
Brewster, William, 145 Brattle St., Cambridge, Mass. 1904.
Brooks, Allan, Okanogan Landing, Br. Columbia. 1906.
Brown, Miss Alice M., Pacific Grove. 1904.
Brown, Herbert, Yuma, Arizona. 1903.
Bryan, Wm. Alanson, Bishop Museum, Honolulu, H. T. 1905.
Carpenter, Nelson, Box 74, Stanford University. 1901.
Carriger, Henry W., Sonoma, Sonoma Co. 1895.
Chamberlin, Corydon. (No address at present). 1893.
Chamberlin, Geo. D. (No address at present). 1893.
Chambers, W. Lee, Santa Monica. 1897.
Chapman, Miss Bertha L., 404 Walsworth Ave., Oakland. 1901.
Chapman, Frank M., Amer. Museum Natural History, New York City. 1903.
Cheney, E. S., 675 E. 25th St., Oakland. 1904.
Childs, John Lewis, Floral Park, N. Y. 1904.
Clark, Ulysses S., San Jose. 1894.
Clemens, Rev. Joseph, Monterey. 1903.
Clifton, H. T., P. O. Box 404, Pasadena. 1904.
Coale, Henry K., Highland Park, Ill. 1906.
Cohen, Donald A., Alameda. 1894.
Colburn, A. E., 1204 So. Main St., Los Angeles. 1905.
Cooper, Jas. S., Haywards. 1903.
Cosper, Chas. E., So. Pasadena. 1906.
Cummings, Claude, Pinole, Contra Costa Co. 1897.
Currier, Ed. S., Box E, St. Johns, Multnomah Co., Oregon. 1904.
Daggett, Frank S., 441 Postal Telegraph Bldg., Chicago, Ill. 1895.
Davis, Evan, Orange. 1894.
Dawson, W. Leon, 5528 15th Ave., University Sta., Seattle, Wash. 1906.
Dean, W. F., Three Rivers, Tulare Co. 1901.
Deane, Ruthven, 504 N. State St., Chicago, Ill. 1904.
Deane, Walter, 29 Brewster St., Cambridge, Mass. 1904.
D'Evelyn, Dr. F. W., 2103 Clinton Ave., Alameda. 1905.
Dille, Fred. M., 2927 W. 28th Ave., Denver, Colo. 1903.
Dixon, Joseph, 50 Worcester Ave., Pasadena. 1904.
Donnell, W. B., 101 S. Euclid Ave., Pasadena. 1905.
Donnelly, Miss M. G., Vernal Ave., Piedmont. 1905.
Dutcher, William, 525 Manhattan Ave., New York City. 1905.
Dwight, Dr. Jonathan, Jr., 2 E. 34th St., New York City. 1904.
Eastman, F. B., Lieut. 10th Inf., Ft. Lawton, Seattle, Wash. 1904.
Emerson, W. Otto, Haywards. 1894.
Eschenburg, Miss Ida M., 2445 Channing Way, Berkeley. 1903.
Fair, Paul J., Box 338, Palo Alto. 1905.
Feudge, John B., 736 So. Grand Ave., Los Angeles. 1902
Finley, Wm. L., 264 Madison St., Portland, Oreg. 1900.
Fisher, Dr. A. K., Dept. Agriculture, Washington, D. C. 1904.
Fisher, Dr. Walter K., Box 77, Palo Alto. 1900.
Flanagan, John H., 392 Benefit St., Providence, R. I. 1904.
Forrester, Miss G. B. (Address unknown) 1903.
Fowler, Fred H., 221 Kingsley Ave., Palo Alto. 1901.
Franklin, Burnell, 1008 So. Fair Oaks Ave., So. Pasadena. 1901.
Fuertes, Louis Agassiz, Cornell Heights, Ithaca, N. Y. 1904.
Gallaher, William, 2240 Telegraph Ave., Berkeley. 1905.
Gane, Henry Stewart, Santa Barbara. 1903.
Gault, Benj. T., Glen Ellyn, Du Page Co., Ill. 1905.
Gay, Harold S., Craftonville. 1898.
Gaylord, Dr. Horace A., Pasadena. 1904.
Gifford, Edw. W., 3256 Briggs Ave., Alameda. 1904.
Gilbert, Dr. Chas. H., Stanford Univ. 1902.
Gilman, M. French, Breen, La Plata Co., Colo. 1901.
Goldman, E. A., Dept. Agriculture, Washington, D. C. 1900.
Gorham, Harry W., Santa Monica. 1904.

Grant, Chapman, 65 Central Park W., New York, N. Y. 1905.
Grey, Henry, 227 2nd St., San Francisco. 1901.
Grinnell, Joseph, 572 N. Marengo Ave., Pasadena. 1894.
Groesbeck, Chas. E., Ocean Park. 1897.
Hahn, Benj. W., Pasadena. 1900.
Hanford, Forrest S., 1363 11th St., Oakland. 1900.
Hanna, Wilson C., Box 146, Colton. 1902.
Harding, Mrs. J. C., Antioch. 1903.
Harker, Miss K. V. D., 111 W. Valerio St., Santa Barbara. 1905.
Heller, Edmund, Riverside. 1894.
Holland, Harold M., Box 515, Galesburg, Ill. 1901.
Hoover, Theodore J., Bodie, Mono Co. 1898.
Howard, Edward A., Hotel Potter, Santa Barbara. 1902.
Howard, O. W., Box 1177, Los Angeles. 1895.
Humphrey, H. B., 381 Channing Ave., Palo Alto. 1905.
Hunter, J. S., 2115 Allston Way, Berkeley. 1903.
Illingworth, J. F., 2201 Harvard Ave., N., Seattle, Wash. 1896.
Ingersoll, A. M., 818 5th St., San Diego. 1895.
Ingram, Wm. N., Pacific Grove. 1901.
Jackson, Willis H., Pescadero. 1901.
Jay, Alphonse, 1622 Pennsylvania Ave., Los Angeles. 1901.
Jay, Antonin, 1622 Pennsylvania Ave., Los Angeles. 1901.
Jenkins, Hubert O., Stanford University. 1902.
Jordan, Dr. David Starr, Stanford Univ. 1902.
Judson, W. B., 5100 Pasadena Ave., Los Angeles. 1894.
Julien, Miss Lillian M., Yreka. 1901.
Kaeding, Geo. L., Box 959, Goldfield, Nev. 1903.
Kaeding, Henry B., care of Cal. Academy Sciences, San Francisco. 1895.
Keeney, Ashby H., 2673 Menlo Ave., Los Angeles. 1904.
Kellogg, Vernon L., Stanford University. 1901.
Kessing, Lawrence R., 1430 Santa Clara Avenue, Alameda. 1899.
Keyes, Chas. R., Mt. Vernon, Iowa. 1900.
King, Geo. W., Santa Rosa. 1906.
Knickerbocker, Chas. K., 503 Western Union Bldg., Chicago, Ill. 1905.
Kuhls, Elsa F., San Ramon, Contra Costa Co. 1904.
Lamb, Chester C., Box 194, Berkeley. 1899.
Law, J. Eugene, Hollywood. 1900.
Lelande, H. J., City Hall, Los Angeles. 1897.
Littlejohn, Chase, Redwood City. 1901.
Loomis, Leverett Mills, Cal. Academy Sciences, San Francisco. 1902.
Love, Chas. A., 3353 22nd St., San Francisco. 1901.
Luce, Geo. W., Haywards. 1904.
Mailliard, John W., 310 California St., San Francisco. 1894.
Mailliard, Joseph, 1815 Vallejo St., San Francisco. 1895.
Marsden, H. W., care Frank Stephens, San Diego. 1905.
Masters, Mrs. Willis W., 494 Kensington Place, Pasadena. 1904.
Mathews, Miss Ellen, 2103 Union Avenue, Los Angeles. 1901.
May, E. Crawford, 485 Maylin St., Pasadena. 1904.
McGregor, R. C., Bureau of Science, Manila, P. I. 1893.
McLain, R. B., Market and 12th Sts., Wheeling, W. Va. 1897.
Mearns, Maj. Edgar A., War Dept., Washington, D. C. 1905.
Metz, Charles W., 323 W. Loucks St., Sheridan, Wyo. 1906.
Miller, John M., Parlier. 1903.
Miller, Loye Holmes, State Normal School, Los Angeles. 1905.
Miner, Dr. H. N., The Eagles' Nest, Ben Lomond. 1903.
Moody, Mrs. C. A., 215 East Avenue 41, Los Angeles. 1898.
Moran, R. B., 661 Waverly St., Palo Alto. 1897.
Morcom, G. Frean, 726 Lake St., Los Angeles. 1904.
Nace, C. A., Santa Clara. 1900.
Nelson, E. W., Dept. Agriculture, Washington, D. C. 1904.
Newbury, F. E., 1153 Washington St., Oakland. 1904.
Newcombe, C. L., 1235 W. 6th St., Los Angeles. 1906.
Newkirk, Dr. Garrett, Slavin Block, Pasadena. 1900.
Newland, Lloyd, 218 Addison Ave., Palo Alto. 1903.
Newsome, Miss Jessie L., 481 Sherman St., Oakland. 1903.
Noack, H. R., 936 Poplar St., Oakland. 1901.
Oberholser, Harry C., 1349 Harvard St., N. W., Washington, D. C. 1904.
Osgood, Wilfred H., Dept. Agriculture, Washington, D. C. 1893.
Owen, Virgil W., Tajo Bldg., care U. S. Dist. Court, Los Angeles. 1896.
Palmer, C. F., 436 Lytton Ave., Palo Alto. 1905.
Palmer, Dr. F. M., Laughlin Blk., Los Angeles. 1902.
Palmer, Dr. T. S., Dept. Agriculture, Washington, D. C. 1903.
Park, Edgar, Thacher School, Nordhoff, Ventura Co. 1905.
Peabody, Rev. P. B., Box 25, Newcastle, Wyoming. 1904.
Pemberton, J. Roy, 771 Haight St., San Francisco. 1900.
Pierce, Wright M., Box 116, Claremont. 1902.

Pinger, Philip, 401 Court St., Los Angeles. 1904.
Pleasants, Mrs. J. E., Box M, Santa Ana. 1900.
Price, A. E., Grant Park, Ill. 1905.
Price, William W., Alta, Placer County. 1898.
Procter, J. W., R. D. No. 2, Ventura. 1905.
Rathbun, S. F., 217 14th Ave. N., Seattle, Wash. 1904.
Ray, Milton S., 299 San Jose Ave., San Francisco. 1899.
Redington, A. P., Box 66, Santa Barbara. 1897.
Renwick, Wm. G., Claremont. 1902.
Reynolds, Roth, 235 E. 4th St., Los Angeles. 1899.
Richardson, Chas., Jr., 435 S. El Molino Ave., Pasadena. 1902.
Richmond, Dr. Chas. W., Smithsonian Inst., Washington, D. C. 1904.
Rising, H. G., 1128 W. 46th St., Los Angeles. 1898.
Ritter, W. E., Univ. of Cal., Berkeley. 1901.
Robertson, Howard, 701 Bryson Blk., Los Angeles. 1896.
Rooney, Dr. R. F., Auburn. 1902.
Rose, Geo. B., Niles. 1904.
Russ, Miss Bertha, Ferndale, Humboldt Co. 1906.
Sampson, Alden, Haverford, Penn. 1905.
Sampson, Walter B., 36 So. California St., Stockton. 1894.
Schneider, Fred A., Jr., Asbury and Laurel Sts., San Jose. 1893.
Schneider, J. J., Box 363, Anaheim. 1899.
Scott, Carroll, 3848 Third St., San Diego. 1905.
Sharp, Clarence S., Escondido. 1902.
Sharpe, Geo. H., Vacaville. 1901.
Sheldon, H. H., Tonopah, Nev. 1903.
Show, S. B., 353 Melville Ave., Palo Alto. 1903
Siefert, Clayton G., Auburn. 1902.
Silloway, P. M., Lewistown, Montana. 1903.
Simmons, Edw., R. F. D., Box 125, Pasadena. 1894.
Skinner, E. H., M. T. M. A., San Rafael. 1900.
Smith, C. Piper, Box 74, Stanford University. 1905.
Smith, Mrs. Ruby G., 15 East Ave., Ithaca, N. Y. 1902.
Snodgrass, Robt. E., Ontario, Cal. 1901.
Snow, A. H., Newark, Alameda Co. 1904.
Snyder, Prof. John O., Stanford University. 1900.
Steinbeck, Wm., Sperry Flour Co., Stockton. 1897.
Stejneger, Dr. L., U. S. Nat. Museum, Washington, D. C. 1904.
Stephens, Frank, 3756 Park Blvd., San Diego. 1894.
Swales, Bradshaw H., 145 Gladstone Ave., Detroit, Mich. 1906.
Swarth, H. S., 356 Belden Ave., Chicago, Ill. 1897.
Swett, Miss Helen, 1265 Franklin St., Oakland. 1901.
Tarbell, Miss Olga S., 166 N. Los Robles Ave., Pasadena. 1906.
Taylor, Harry R., Box 95, Alameda. 1893.
Taylor, Loren E., Fyffe, El Dorado Co. 1897.
Taylor, Walter P., 1302 Summit Ave., Pasadena. 1905.
Thayer, John E., Box 98, Lancaster, Mass. 1906.
Towne, George S., Box 13, Palo Alto. 1901.
Treadwell, E. D., Mayer, Arizona. 1900.
Tyler, J. G., Box 61, R. F. D. 8, Fresno. 1905.
Van Fleet, Clark C., 2020 Pacific Ave., San Francisco. 1906.
Ward, Harold C., 723 Paru St., Alameda. 1894.
Warren, E. V., Pacific Grove. 1899.
Waterman, Miss Edith S., 728 Paru St., Alameda. 1906.
Watson, Murray M., 210 New York St., Los Angeles. 1902.
Way, W. Scott, Box 223, Pasadena. 1904.
Welch, John M. (No address at present.) 1898.
Wessel, Louis, Railway Mail Service, Butte, Mont. 1906.
Wheeler, Roswell S., 1417 Grand St., Alameda. 1894.
Wicks, M. L., Jr., 128 I. W. Hellman Blk., Los Angeles. 1895.
Widmann, Otto, 5105 Morgan St., St. Louis, Missouri. 1904.
Wiebalk, Miss Anna M., 1307 Central Ave., Alameda. 1904.
Willard, F. C., Tombstone, Ariz. 1905.
Willard, John M., 142 Ave. 42 East, Los Angeles. 1901.
Willard, Mrs. John M., care John M. Willard (q. v.). 1902.
Willett, G., 136 W. 22d St., Los Angeles. 1905.
Williamson, A., 18 W. California St., Pasadena. 1905.
Wilson, Joseph Elmer, 1721 Alameda Ave., Alameda. 1903.
Woodruff, Frank M., Chicago Academy of Science, Lincoln Park, Chicago, Ill. 1906.
Wright, Foster C., Room 415, Mason Bldg., Los Angeles. 1903.
Wueste, R., 5th and Brooke Sts., San Diego. 1901.
Zahn, Otto J., 2115 Estrella Ave., Los Angeles. 1896.
Zschokke, A. J., 1105 Pacific Ave., Alameda. 1897.

DECEASED MEMBERS

Barlow, Chester	Brokaw, Louis A.
Bryan, Miss Mollie	Burcham, J. S.
Bryant, Walter E.	Cobleigh, W. S.
Chambliss, George S.	Conant, George
Cooper, Dr. James G.	Hatch, J. M.
Herrick, Miss Bertha	Hawkins, Col. L. L.
Nims, Lee	Lapham, A. L.
Slevin, Thomas E.	Ready, George H.
Stert, A.	